REMARKS

Claims 1–3, 10, 31-33, 40–41, and 50 have been amended in this action. Claims 9, 39, 42-44, and 49 have been canceled. No new matter or lack of written description should arise from these amendments.

In the office action, the examiner noted that Claims 11- 30 were allowed. Applicants kindly thank examiner for this indication of allowability.

Claim Objections

The examiner objected to claims 32-34 and 42-44 as being in improper dependent form. Applicants have amended Claims 32-33 and canceled Claims 42-44. Applicant believes that these amendments overcome the examiner's objections and request reconsideration.

The examiner has objected to Claims 9, 10, 39, 40, 49, 50, 59 and 60 as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Applicants have amended Claims 1-3, 10, 31-33, 41 and 50 and canceled claims 9, 39, 42-44, and 49 based on the examiner's indication of allowance. Applicant believes that these amendments overcome the examiner's objections with regard to Claims 9, 10, 39, 40, 49, 50 and request reconsideration.

Rejection under 35 U.S.C. §102

The examiner has rejected Claims 1, 3, 5-8, 31, 32, 35-38, 41, 45-48, 51, 52, 55-58 under 35 USC § 102(b) as being anticipated by Hossain. Applicants have amended or canceled claims 1, 3, 5-8, 31, 32, 35-38, 41, 45-48, and believe those amendments are responsive with regard to claims 1, 3, 5-8, 31, 32, 35-38, 41, 45-48. With respect to Claims 51, 52, 55-58 applicants respectfully submit the following remarks/arguments.

The examiner states that with regard to Claim 51, Hossain discloses a neutron detection device comprising an active semiconductor layer including a plurality of charge-sensitive cells and a

neutron conversion layer located adjacent, in contact with, or in close proximity to said cells which is located with a distance from the said active semiconductor no greater than the range of the neutron reactant product particles traversing the distance.

Applicants respectfully submit that Hossain does not teach or disclose that the neutron conversion layer is located within a distance from the active semiconductor layer no greater than the range of the neutron reactant product particles traversing the distance.

Hossain never discloses that the range of the neutron reactant product particles as an element of his device. "Range" is a term of art in neutron reactant product particles. According to the Handbook of Modern Ion Beam Materials Analysis, J. Tesmer, M. Nastasi, J. C. Barbour, C.J. Maggiore, and J.W. Mayer, eds., Materials Research Society, Pittsburgh PA, 1995, pg. 15 "Projected range is defined as the mean depth from the target surface at which the ion comes to a halt." Target surface, a term of art in ion implantation, would here be understood as the point of origin of the particle. This range is a mean, i.e. an average taken over many particles, and can be experimentally measured and theoretically calculated. "The number of collisions experienced by an ion per unit path length and the energy lost per collision are random variables, i.e., all ions having the same incident energy do not stop at the same location" (see Emanuele Rimini, Ion Implantation: Basics to Device Fabrication, Kluwer Academic Publishers, Boston MA, 1995, pgs. 79-80). Note that, at a distance of one range, half the particles will not reach the active semiconductor layer.

Handbook of Modern Ion Beam Materials Analysis, p. 15 also discusses straggling: "By range straggling we mean the width of the ion range distribution." Many examples of the depth profile of ion deposition are to be found in the literature. For example, Fig. 1.15 (p. 23) in Ion Implantation: Basics to Device Fabrication, by Emanuele Rimini, shows depth profiles for phosphorus in silicon at several energies. There is a well defined depth at which the deposition of initially monoenergetic ions is greatest, with a falloff to both deeper and shallower deposition depths. Such curves are typically measured over about two decades in concentration. Boron would exhibit similar curves. These curves graphically portray both the range and the width of the range distribution (straggling).

Hossain states that his device need only detect one particle in order to have detected neutrons. However, Hossain's discussion of spurious counts (col. 6, lines 5-9), which occur regardless of neutron presence, introduces doubt that a single particle could be determined to be due to the presence of a neutron. Hossain does not teach or disclose the importance of "range" as it is known in the art. His concept of "near" does not sufficiently disclose the information required to determine if the neutron reactant product particles are actually within "range". If "near" is not within the "range", the sensor may only actually detect straggling particles, with the result that the detection device either provides a false positive reading or does not operate with high sensitivity, and may be many orders of magnitude below what is realizable when the neutron reactant product particles are within range.

The examiner has stated that Figs. 1a-1e provide support for the rejection that Hossain disclosed that the cells are located within a distance from the said active semiconductor layer no greater than the range of neutron reactance product particles traversing the distance. Applicants respectfully disagree. No where in the specification does Hossain actually use the term "range". Given that range has such a well-defined meaning in the art, it cannot be inferred that Hossain intended "near" to be equivalent to "within range" based on the Figures recited. Even considering Figs. 2B and 2C, range cannot be inferred from the image or corresponding discussion. The discussion turns on how such a device could work as a neutron detector in theory, without any discussion of the importance of the neutron conversion layer being located within a distance from the active semiconductor layer no greater than the range of the neutron reactant product particles traversing the distance the neutron conversion layer. Thus Hossain provides no indication of the importance of "range" in determining how "near' the neutron conversion layer needs to be from the active semiconductor material in order to have some assurance that the detection event is accurate. In contrast, applicants have disclosed and claimed that the neutron conversion layer is located within a distance from the active semiconductor layer no greater than the range of neutron reactant product particles traversing the distance.

Applicants respectfully submit that the examiner's rejection has been overcome and request reconsideration.

Rejection under 35 USC 103

Claims 3, 4, 33, 34, 43, 44, 53 and 54 were rejected under 35 USC 103(a) as being unpatentable over Hossain in view of Brandl. Applicant believes that the amendments made overcome this rejection with respect to claims 3, 4, 33, 34, 43, and 44. Claims 53 and 54 depend, either directly or indirectly from Claim 51. Applicants respectfully submit that the examiner's rejection of Claim 51 has been overcome, and since claims 53 and 54 depend from claim 51, they would be allowable as well. Applicants respectfully request reconsideration.

In conclusion, Applicants respectfully submit that the Examiner's Office Action has been fully responded to and that the claims are in condition for allowance. In the furtherance of compact prosecution, if a personal or telephone interview would help expedite matters, the Examiner is requested to contact Amy Ressing at 202-404-1558. Applicants respectfully request that a timely Notice of Allowance be issued in this case.

Please charge the fees due for this action to Deposit Account 50-0281. Kindly charge any additional fees due, or credit overpayment of fees, to Deposit Account No. 50-0281.

Dated: 26 January 2007

Respectfully submitted,

By Amy L Ressing

Amy L. Ressing
Registration No.: 45,814
US NAVAL RESEARCH LABORATORY
4555 Overlook Ave, SW
Washington, DC 20375
(202) 404-1558
(202) 404-7380 (Fax)
Attorney For Applicant